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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---------------------------|-------------|----------------------|---------------------|------------------|
| 10/754,037 | 01/08/2004 | Prasad Shripad Kadle | DP-310651 | 6095 |
| 22851 | 7590 | 11/25/2005 | EXAMINER | |
| DELPHI TECHNOLOGIES, INC. | | | FORD, JOHN K | |
| M/C 480-410-202 | | | ART UNIT | |
| PO BOX 5052 | | | PAPER NUMBER | |
| TROY, MI 48007 | | | 3753 | |

DATE MAILED: 11/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------|--------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/754,037 | KADLE ET AL. | |
| | Examiner | Art Unit | |
| | John K. Ford | 3753 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Nov. 14, 2005
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-11 is/are allowed.
- 6) ☒ Claim(s) 1, 3-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Applicant's response filed November 14, 2005 has been studied carefully.

To reiterate the examiner's position regarding applicant's system, because orifice tube 24 is always open, there will always be some finite amount of flow through orifice tube 24 because valve 26, even when it is fully open must inherently have a small amount of fluid resistance. That small fluid resistance will inherently cause some of the refrigerant flow (albeit a small amount) to move through the orifice tube 24 – the amount of flow being a function of the relative fluid resistances of the valve 26 and orifice 24. Applicant's disclosed system in regard to applicant's valve 26 and orifice 24 operates precisely in the same manner as Okawara's valve 21 and orifice 31. When Okawara's valve 21 is open (as shown in Figure 3A) most of the serial flow will bypass orifice 31 (by passing through the main port 30). Likewise when Okawara's valve 21 is closed (as shown in Figure 3B) almost all of the flow will be through orifice 31.

As pointed out by applicant, on page 8 of the July 14, 2005 amendment, there will always be flow through orifice 31 of Okawara regardless of the position of valves 21 and 29. By whatever reasoning (which is correct) applicant has employed to reach this conclusion, the same must hold true for applicant's valve 26 and high pressure orifice 24.

Claims 1, 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Okawara (6,422,308) and Enomoto et al (5,291,941) and, optionally, Hamilton et al (5,491,983).

In Okawara, a compressor is shown at 2, front end condenser at 3, chiller-condenser at Ea, chiller-evaporator at Eb and two 2-way valves Vs1 and Vs2 functioning as a three-way valve. A bypass line B is shown. Valve 5b is a bypass valve that directs flow through a heat pump expansion device 31 during a heat pump mode. Chiller evaporator Eb functions as an evaporator during the heat pump mode.

Enomoto teaches that the two-way valves 181 and 182 controlling the condenser path (11) and bypass path (20) can be replaced by a single three-way valve (see col. 6, lines 1-2). Because valves 181 and 182 function identically to Vs1 and Vs2 of Okawara, it would have been obvious to have replaced Okawara's valves Vs1 and Vs2 by a single three way valve to advantageously reduce the "part count" and hence lower manufacturing costs.

Moreover, (regarding the limitation of original claim 2, now written into claim 1) to have moved valve 5a of Okawara to a point immediately downstream of Vc1 (before the rejoining of the bypass B) would have been obvious in view of Enomoto teaching this location for expansion valve 13. Regarding claim 3, all the prior references show this. Refrigeration systems are inoperative without it. Regarding claim 4, an accumulator 15 is shown at the compressor inlet in Enomoto. To have used a conventional accumulator/drier at the inlet to the compressor of Okawara to prevent corrosion damage and minimize the possibility of "slugging" the compressor would have been obvious. See Hamilton, USP 5,491,983, assigned to General Motors, for a typical accumulator/dehydrator.

Claims 1 and 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okawara/Enomoto as applied to claims 1, 3 and 4 above, and further in view of Hirota (JP 11-301254) or Baker (6,230,508).

Okawara and Enomoto both teach conventional evaporators and condensers that transfer heat or cold energy from the refrigerant to air. See specifically Eb and Ea of Okawara that are arranged so as to serially connected with respect to the air flow to the compartment.

Such refrigerant to air heat exchangers as taught by Okawara at Eb and Ea are disadvantageous from two points of view. First, if the refrigerant is dangerous (see Hirota's Abstract) it would potentially leak into the compartment in an accident. Second, as pointed out by Baker, such systems have no "reservoir capacity" to condition the compartment when the compressor cycles on and off, leading to mildly uncomfortable oscillations in air discharge temperature.

Both Hirota and Baker teach, as a solution to these problems, the use of a secondary liquid loop to transport the heat or cold from the heat exchanger (evaporator or condenser) through a pumped liquid conduit to a heat exchanger located in the cabin thereby advantageously avoiding the accidental discharge of dangerous refrigerant and

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advantageously permitting some storage capacity for heat or cold to "even out" discharge temperatures.

To have piped liquid through heat exchangers Eb and Ea of Okawara (instead of air) and to have transported, via a liquid piping system, that heating/cooling energy to a liquid-to-air heat exchanger located in the passenger compartment would have been obvious for the two reasons discussed above.

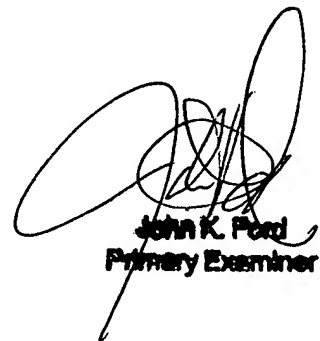
THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John K. Ford whose telephone number is 571-272-4911.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John K. Ford
Primary Examiner